Lightweight and Environmentally Durable Propulsion Components, Phase II

Completed Technology Project (2006 - 2008)

Project Introduction

Silicon carbide matrix composites can produce turbomachinery structures with 1500

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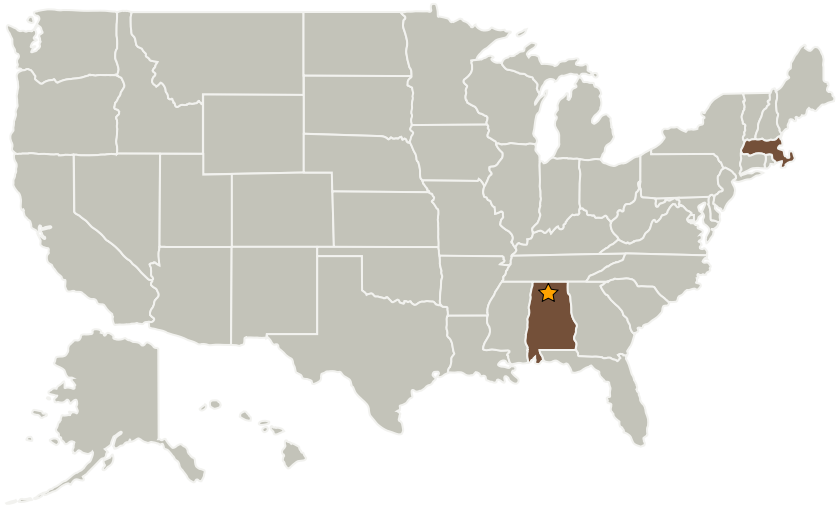
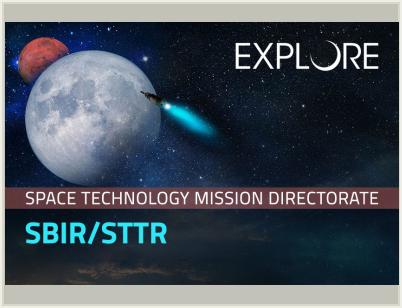
C service temperature capability at less than one-half the weight of metallic structures. This would translate into substantial improvement in rocket (or aircraft) system performance. However, SiC composites do not have adequate long term stability under hot, humid turbine engine conditions. Thus, reliable environmental barrier coating (EBC) technology needs to be developed for SiC composites for long duration or reusable turbomachinery applications. The preceding SBIR Phase I program proved feasibility of our technology to improve environmentally durability of silicon carbide CMCs. The Phase II program will refine coating materials and processes. A comprehensive test matrix is included to assess repeatability in environmental barrier performance. Next, this technology will be used to produce representative turbine engine test articles. Surmet has teamed with a major prime contractor, so as to develop technology that is useful towards near-term NASA systems. Key environmental barrier testing work will be conducted at specialized test facility that simulates turbine engine environment. Thus, the Phase II program will provide a strong foundation for a follow-on Phase III program which will start implementation into specific NASA system(s).

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Surmet Corporation	Supporting Organization	Industry	Burlington, Massachusetts

Primary U.S. Work Locations	
Alabama	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.5 Coatings